

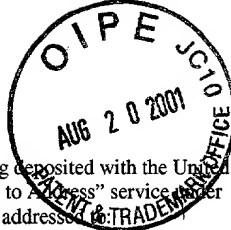
Express Mail™ Label No. EL 903200133 US  
Date of Deposit: August 20, 2001

I hereby certify that this correspondence is being deposited with the United States Postal Service "Express Mail Post Office to Address" service under 37 CFR 1.10 on the date indicated above and is addressed to:

Assistant Commission for Patents  
Washington, DC 20231

TOWNSEND and TOWNSEND and CREW LLP

By: Maisie C. Livengood  
Maisie C. Livengood



PATENT  
015389-002921US  
018/180C

**IN THE UNITED STATES PATENT AND TRADEMARK OFFICE**

In re application of:

Cech et al.

Application No.: 09/766,253

Filed: January 19, 2001

For: NOVEL TELOMERASE

Art Unit: 1655

PRELIMINARY AMENDMENT

Box MISSING PARTS  
Assistant Commissioner for Patents  
Washington, D.C. 20231

Sir:

In advance of prosecution on the merits and in response to the Notice to File Corrected Application Papers mailed April 19, 2001, Applicants respectfully request entry of the following amendment.

IN THE SPECIFICATION:

Please replace the paragraph beginning at page 1, line 2 with the following rewritten paragraph:

The present application is a continuation of U.S. Patent Application No. 08/846,017, filed April 25, 1997, abandoned; which is a continuation-in-part of U.S. Patent Application No. 08/844,419, filed April 18, 1997, abandoned; which is a continuation-in-part of U.S. Patent Application No. 08/724,643 filed October 1, 1996, abandoned; each of which are incorporated herein by reference in its entirety.

Please replace the paragraph beginning at page 10, line 6 with the following rewritten paragraph:

--The present invention further provides substantially purified polypeptides comprising the amino acid sequence comprising SEQ ID NOS:63, 64, 65, 67, and 69. In another embodiment, the present invention also provides purified, isolated polynucleotide sequences encoding the polypeptides comprising the amino acid sequences of SEQ ID NOS: 63, 64, 65, 67, and 69. The present invention contemplates portions or fragments of SEQ ID NOS:63, 64, 65, 67, and 69, of various lengths. In one embodiment, the portion of polypeptide comprises fragments of lengths greater than 10 amino acids. However, the present invention also contemplates polypeptide sequences of various lengths, the sequences of which are included within SEQ ID NOS:63, 64, 65, 67, and 69, ranging from 5 to 500 amino acids (as appropriate, based on the length of SEQ ID NOS:63, 64, 65, 67, and 69).--

Please replace the paragraph beginning at page 10, line 17 with the following rewritten paragraph:

--The present invention also provides nucleic acid sequences comprising SEQ ID NOS:55, 62, 66, and 68, or variants thereof. The present invention further provides fragments of the isolated polynucleotide sequences that are at least 6 nucleotides, at least 25 nucleotides, at least 30 nucleotides, at least 50 nucleotides, at least 100 nucleotides, at least 250 nucleotides, and at least 500 nucleotides in length (as appropriate for the length of the sequence of SEQ ID NOS:55, 62, 66, and 68, or variants thereof).--

Please replace the paragraph beginning at page 10, line 24 with the following rewritten paragraph:

--In particularly preferred embodiments, the polynucleotide hybridizes specifically to telomerase sequences, wherein the telomerase sequences are selected from the group consisting of human, *Euplotes aediculatus*, *Oxytricha*, *Schizosaccharomyces*, and *Saccharomyces* telomerase sequences. In other preferred embodiments, the present invention provides polynucleotide sequences comprising the complement of nucleic acid sequences selected from the group consisting of SEQ ID NOS:55, 62, 66, and 68, or variants thereof. In yet other preferred embodiments, the present invention provides polynucleic acid sequences that hybridize under stringent conditions to at least one nucleic acid sequence selected from the group consisting of SEQ ID NOS:55, 62, 66, and

68. In a further embodiment, the polynucleotide sequence comprises a purified, synthetic nucleotide sequence having a length of about ten to thirty nucleotides.--

Please replace the paragraph beginning at page 11, line 21 with the following rewritten paragraph:

--The present invention also provides antisense molecules comprising the nucleic acid sequence complementary to at least a portion of the polynucleotide of SEQ ID NOS:55, 62, 66, 67, and 68. In an alternatively preferred embodiment, the present invention also provides pharmaceutical compositions comprising antisense molecules of SEQ ID NOS:55, 62, 67, and 68, and a pharmaceutically acceptable excipient and/or other compound (*e.g.*, adjuvant).--

Please replace the paragraph beginning at page 12, line 1 with the following rewritten paragraph:

--The present invention also provides methods for producing polypeptides comprising the amino acid sequence of SEQ ID NOS:61, 63, 65, 67, or 68, the method comprising the steps of: culturing a host cell under conditions suitable for the expression of the polypeptide; and recovering the polypeptide from the host cell culture.--

Please replace the paragraph beginning at page 12, line 6 with the following rewritten paragraph:

--The present invention also provides purified antibodies that binds specifically to a polypeptide comprising at least a portion of the amino acid sequence of SEQ ID NOS:55, 63, 64, 65, 67, and/or 69. In one embodiment, the present invention provides a pharmaceutical composition comprising at least one antibody, and a pharmaceutically acceptable excipient.--

Please replace the paragraph beginning at page 12, line 11 with the following rewritten paragraph:

--The present invention further provides methods for the detection of human telomerase in a biological sample comprising the steps of: providing a biological sample suspected of expressing human telomerase protein; and at least one antibody that binds specifically to at least a portion of the amino acid sequence of SEQ ID NOS:55, 63, 64, 65, 67, and/or 69; combining the biological sample

09766253-0001

and antibody(ies) under conditions such that an antibody:protein complex is formed; and detecting the complex wherein the presence of the complex correlates with the expression of the protein in the biological sample.--

Please replace the paragraph beginning at page 12, line 19 with the following rewritten paragraph:

--The present invention further provides substantially purified peptides comprising the amino acid sequence selected from the group consisting of SEQ ID NOS:71, 73, 75, 77, 79, 82, 83, 85, and 101. In an alternative embodiment, the present invention provides purified, isolated polynucleotide sequences encoding the polypeptide corresponding to these sequences. In preferred embodiments, the polynucleotide hybridizes specifically to telomerase sequences, wherein the telomerase sequences are selected from the group consisting of human, *Euplotes aediculatus*, *Oxytricha*, *Schizosaccharomyces*, and *Saccharomyces* telomerase sequences. In yet another embodiment, the polynucleotide sequence comprises the complement of a nucleic acid sequence selected from the group consisting of SEQ ID NOS:70, 72, 74, 76, 78, 80, 81, and 100, and variants thereof. In a further embodiment, the polynucleotide sequence that hybridizes under stringent conditions to a nucleic acid sequence selected from the group consisting of SEQ ID NOS:66, 68, 80, and 81. In yet another embodiment, the polynucleotide sequence is selected from the group consisting of SEQ ID NOS:70, 72, 74, 76, 78, 87, 88, 89, 90, 91, 92, 93, 94, 95, 96, 97, 98, 99, 102, 103, 104, 105, 106, 107, 108, 109, and 110. In an alternative embodiment, the nucleotide sequence comprises a purified, synthetic nucleotide sequence having a length of about ten to fifty nucleotides.--

Please replace the paragraph beginning at page 13, line 22 with the following rewritten paragraph:

The present invention also provides antisense molecules comprising the nucleic acid sequence complementary to at least a portion of the polynucleotide of SEQ ID NOS:82 and 100. In an alternatively preferred embodiment, the present invention also provides pharmaceutical compositions comprising antisense molecules of SEQ ID NOS:82 and 100, and a pharmaceutically acceptable excipient and/or other compound (*e.g.*, adjuvant).

Please replace the paragraph beginning at page 14, line 3 with the following rewritten paragraph:

--The present invention also provides methods for producing polypeptides comprising the amino acid sequence of SEQ ID NOS:82, 83, 84, 85, and 101, the method comprising the steps of: culturing a host cell under conditions suitable for the expression of the polypeptide; and recovering the polypeptide from the host cell culture.--

Please replace the paragraph beginning at page 14, line 8 with the following rewritten paragraph:

--The present invention also provides purified antibodies that binds specifically to a polypeptide comprising at least a portion of the amino acid sequence of SEQ ID NOS:71, 73, 75, 77, 79, 82, 83, 84, 85, and/or 101. In one embodiment, the present invention provides a pharmaceutical composition comprising at least one antibody, and a pharmaceutically acceptable excipient.--

Please replace the paragraph beginning at page 14, line 13 with the following rewritten paragraph:

--The present invention further provides methods for the detection of human telomerase in a biological sample comprising the steps of: providing a biological sample suspected of expressing human telomerase protein; and at least one antibody that binds specifically to at least a portion of the amino acid sequence of SEQ ID NOS:71, 73, 75, 77, 79, 82, 83, 84, 85, 87, and/or 101; combining the biological sample and antibody(ies) under conditions such that an antibody:protein complex is formed; and detecting the complex wherein the presence of the complex correlates with the expression of the protein in the biological sample.--

Please replace the paragraph beginning at page 16, line 18 with the following rewritten paragraph:

--Figure 25 shows the alignment of the human telomere amino acid motifs (SEQ ID NO:67), with portions of the *tez1* sequence (SEQ ID NO:63), *Est2p* (SEQ ID NO:64), and the *Euplotes* p123 (SEQ ID NO:65).--

09766253 0001

Please replace the paragraph beginning at page 16, line 26 with the following rewritten paragraph:

--Figure 29 shows the amino acid sequence of *tez1* (SEQ ID NO:69).--

Please replace the paragraph beginning at page 16, line 27 with the following rewritten paragraph:

--Figure 30 shows the DNA sequence of *tez1* (SEQ ID NO:68).--

Please replace the paragraph beginning at page 17, line 1 with the following rewritten paragraph:

--Figure 32 (SEQ ID NOS:112-117) shows the sequences of peptides useful for production of antibodies.--

Please replace the paragraph beginning at page 17, line 3 with the following rewritten paragraph:

--Figure 34 (SEQ ID NOS:118-121) shows two degenerate primers used in PCR to identify the *S. pombe* homolog of the *E. aediculatus* p123 sequences.--

Please replace the paragraph beginning at page 17, line 5 with the following rewritten paragraph:

--Figure 35 (SEQ ID NOS:119, 121) shows the four major bands produced in PCR using the degenerate primers.--

Please replace the paragraph beginning at page 17, line 7 with the following rewritten paragraph:

--Figure 36 (SEQ ID NOS: 58, 118, 121-130) shows the alignment of the M2 PCR product with *E. aediculatus* p123, *S. cerevisiae*, and *Oxytricha* telomerase protein sequences.--

Please replace the paragraph beginning at page 17, line 9 with the following rewritten paragraph:

--Figure 37 (SEQ ID NOS:131-132) is a schematic showing the 3' RT PCR strategy.--

09766253.6

Please replace the paragraph beginning at page 17, line 15 with the following rewritten paragraph:

--Figure 41 (SEQ ID NOS: 133-147) shows the alignment of RT domains from telomerase catalytic subunits.--

Please replace the paragraph beginning at page 17, line 17 with the following rewritten paragraph:

--Figure 42 (SEQ ID NOS: 2, 55, 69) shows the alignment of three telomerase sequences.--

Please replace the paragraph beginning at page 17, line 25 with the following rewritten paragraph:

--Figure 47 (SEQ ID NOS: 100-101) shows the DNA (SEQ ID NO:100) and amino acid (SEQ ID NO:101) of the ORF encoding an approximately 63 kDa telomerase protein or fragment thereof.--

Please replace the paragraph beginning at page 17, line 28 with the following rewritten paragraph:

--Figure 48 (SEQ ID NOS: 148-171) shows an alignment of reverse transcriptase motifs from various sources.--

#### REMARKS

Applicants request entry of this Amendment in adherence with 37 C.F.R. §§ 1.821-1.825. These amendments simply provide sequence identifiers for sequences previously provided and thus introduce no new matter. This Amendment is accompanied by a paper copy of the sequence information.

The amendment to the priority documents simply updates application information and the language, including the incorporation by reference language, is consistent with that used on the transmittal page. Thus, this amendment adds no new matter.

Attached hereto is a marked-up version of the changes made to the specification and claims by the current amendment. The attached page is captioned **"Version with markings to show changes made"**.

CONCLUSION

In view of the foregoing, Applicants believe all claims now pending in this Application are in condition for allowance. The issuance of a formal Notice of Allowance at an early date is respectfully requested.

If the Examiner believes a telephone conference would expedite prosecution of this application, please telephone the undersigned at 303-571-4000.

Respectfully submitted,



Scott L. Ausenhus  
Reg. No. 42,271

TOWNSEND and TOWNSEND and CREW LLP  
Two Embarcadero Center, 8<sup>th</sup> Floor  
San Francisco, California 94111-3834  
Tel: (415) 576-0200  
Fax: (415) 576-0300  
SLA:mcl  
DE 7044603 v1

TOWNSEND and CREW LLP



**VERSION WITH MARKINGS TO SHOW CHANGES MADE**

The paragraph beginning at line 2 of page 1 has been amended as follows:

The present application is a [Continuation-In-Part application of U.S. Patent Appln. Ser. No. 08/\_\_\_\_\_, filed 04/18/97, which is a Continuation-in-Part of U.S. Patent Appln. Ser. No. 08/724,643, filed on October 1, 1996] continuation of U.S. Patent Application No. 08/846,017, filed April 25, 1997, abandoned; which is a continuation-in-part of U.S. Patent Application No. 08/844,419, filed April 18, 1997, abandoned; which is a continuation-in-part of U.S. Patent Application No. .08/724,643 filed October 1, 1996, abandoned; each of which is incorporated herein by reference in its entirety.

The paragraph beginning at line 6 of page 10 has been amended as follows:

The present invention further provides substantially purified polypeptides comprising the amino acid sequence comprising SEQ ID NOS:[61,] 63, 64, 65, 67, and [68] 69. In another embodiment, the present invention also provides purified, isolated polynucleotide sequences encoding the polypeptides comprising the amino acid sequences of SEQ ID NOS:[61,] 63, 64, 65, 67, and [68] 69. The present invention contemplates portions or fragments of SEQ ID NOS:[61,] 63, 64, 65, 67, and [68] 69, of various lengths. In one embodiment, the portion of polypeptide comprises fragments of lengths greater than 10 amino acids. However, the present invention also contemplates polypeptide sequences of various lengths, the sequences of which are included within SEQ ID NOS:61, 63, 64, 65, 67, and [68] 69, ranging from 5 to 500 amino acids (as appropriate, based on the length of SEQ ID NOS:[61,] 63, 64, 65, 67, and [68] 69).

The paragraph beginning at line 17 of page 10 has been amended as follows:

The present invention also provides nucleic acid sequences comprising SEQ ID NOS:55, 62, 66, and [69] 68, or variants thereof. The present invention further provides fragments of the isolated polynucleotide sequences that are at least 6 nucleotides, at least 25 nucleotides, at least 30 nucleotides, at least 50 nucleotides, at least 100 nucleotides, at least 250 nucleotides, and at least 500 nucleotides in length (as appropriate for the length of the sequence of SEQ ID NOS:55, 62, 66, and [69] 68, or variants thereof).

The paragraph beginning at line 24 of page 10 has been amended as follows:

In particularly preferred embodiments, the polynucleotide hybridizes specifically to telomerase sequences, wherein the telomerase sequences are selected from the group consisting of human, *Euplotes aediculatus*, *Oxytricha*, *Schizosaccharomyces*, and *Saccharomyces* telomerase sequences. In other preferred embodiments, the present invention provides polynucleotide sequences comprising the complement of nucleic acid sequences selected from the group consisting of SEQ ID NOS:55, 62, 66, and [69] 68, or variants thereof. In yet other preferred embodiments, the present invention provides polynucleic acid sequences that hybridize under stringent conditions to at least one nucleic acid sequence selected from the group consisting of SEQ ID NOS:55, 62, 66, and [69] 68. In a further embodiment, the polynucleotide sequence comprises a purified, synthetic nucleotide sequence having a length of about ten to thirty nucleotides.

The paragraph beginning at line 21 of page 11 has been amended as follows:

The present invention also provides antisense molecules comprising the nucleic acid sequence complementary to at least a portion of the polynucleotide of SEQ ID NOS:55, 62, 66, 67, and [69] 68. In an alternatively preferred embodiment, the present invention also provides pharmaceutical compositions comprising antisense molecules of SEQ ID NOS:55, 62, 67, and [69] 68, and a pharmaceutically acceptable excipient and/or other compound (*e.g.*, adjuvant).

The paragraph beginning at line 1 of page 12 has been amended as follows:

The present invention also provides methods for producing polypeptides comprising the amino acid sequence of SEQ ID NOS:61, 63, 65, 67, or [69] 68, the method comprising the steps of: culturing a host cell under conditions suitable for the expression of the polypeptide; and recovering the polypeptide from the host cell culture.

The paragraph beginning at line 6 of page 12 has been amended as follows:

The present invention also provides purified antibodies that binds specifically to a polypeptide comprising at least a portion of the amino acid sequence of SEQ ID NOS:55, [61,] 63, 64, 65, 67, and/or [68] 69. In one embodiment, the present invention provides a pharmaceutical composition comprising at least one antibody, and a pharmaceutically acceptable excipient.

09766253, 082001

The paragraph beginning at line 11 of page 12 has been amended as follows:

The present invention further provides methods for the detection of human telomerase in a biological sample comprising the steps of: providing a biological sample suspected of expressing human telomerase protein; and at least one antibody that binds specifically to at least a portion of the amino acid sequence of SEQ ID NOS:55, [61,] 63, 64, 65, 67, and/or [68] 69; combining the biological sample and antibody(ies) under conditions such that an antibody:protein complex is formed; and detecting the complex wherein the presence of the complex correlates with the expression of the protein in the biological sample.

The paragraph beginning at line 19 of page 12 has been amended as follows:

The present invention further provides substantially purified peptides comprising the amino acid sequence selected from the group consisting of SEQ ID NOS:71, 73, 75, 77, 79, 82, 83,[ 83,] 85, [86], and 101. In an alternative embodiment, the present invention provides purified, isolated polynucleotide sequences encoding the polypeptide corresponding to these sequences. In preferred embodiments, the polynucleotide hybridizes specifically to telomerase sequences, wherein the telomerase sequences are selected from the group consisting of human, *Euplotes aediculatus*, *Oxytricha*, *Schizosaccharomyces*, and *Saccharomyces* telomerase sequences. In yet another embodiment, the polynucleotide sequence comprises the complement of a nucleic acid sequence selected from the group consisting of SEQ ID NOS:70, 72, 74, 76, 78, 80, 81, and 100, and variants thereof. In a further embodiment, the polynucleotide sequence that hybridizes under stringent conditions to a nucleic acid sequence selected from the group consisting of SEQ ID NOS:66, [69] 68, 80, and 81. In yet another embodiment, the polynucleotide sequence is selected from the group consisting of SEQ ID NOS:70, 72, 74, 76, 78, 87, 88, 89, 90, 91, 92, 93, 94, 95, 96, 97, 98, 99, 102, 103, 104, 105, 106, 107, 108, 109, and 110. In an alternative embodiment, the nucleotide sequence comprises a purified, synthetic nucleotide sequence having a length of about ten to fifty nucleotides.

The paragraph beginning at line 22 of page 13 has been amended as follows::

The present invention also provides antisense molecules comprising the nucleic acid sequence complementary to at least a portion of the polynucleotide of SEQ IDS NOS:82 and 100. In an alternatively preferred embodiment, the present invention also provides pharmaceutical

compositions comprising antisense molecules of SEQ ID NOS:82 and 100, and a pharmaceutically acceptable excipient and/or other compound (*e.g.*, adjuvant).

The paragraph beginning at line 3 of page 14 has been amended as follows:

The present invention also provides methods for producing polypeptides comprising the amino acid sequence of SEQ ID NOS:82, 83, 84, 85, [86,] and 101, the method comprising the steps of: culturing a host cell under conditions suitable for the expression of the polypeptide; and recovering the polypeptide from the host cell culture.

The paragraph beginning at line 8 of page 14 has been amended as follows:

The present invention also provides purified antibodies that binds specifically to a polypeptide comprising at least a portion of the amino acid sequence of SEQ ID NOS:71, 73, 75, 77, 79, 82, 83, 84, 85, [86,] and/or 101. In one embodiment, the present invention provides a pharmaceutical composition comprising at least one antibody, and a pharmaceutically acceptable excipient.

The paragraph beginning at line 13 of page 14 has been amended as follows:

The present invention further provides methods for the detection of human telomerase in a biological sample comprising the steps of: providing a biological sample suspected of expressing human telomerase protein; and at least one antibody that binds specifically to at least a portion of the amino acid sequence of SEQ ID NOS:71, 73, 75, 77, 79, 82, 83, 84, 85, [86,] 87, and/or 101; combining the biological sample and antibody(ies) under conditions such that an antibody:protein complex is formed; and detecting the complex wherein the presence of the complex correlates with the expression of the protein in the biological sample.

The paragraph beginning at line 18 of page 16 has been amended as follows:

Figure 25 shows the alignment of the human telomere amino acid motifs (SEQ ID NO:[61] 67), with portions of the *tez1* sequence (SEQ ID NO:63), *Est2p* (SEQ ID NO:64), and the *Euplotes* p123 (SEQ ID NO:65).

The paragraph beginning at line 26 of page 16 has been amended as follows:

Figure 29 shows the amino acid sequence of *tez1* (SEQ ID NO:[68] 69).

The paragraph beginning at line 27 of page 16 has been amended as follows:

Figure 30 shows the DNA sequence of *tez1* (SEQ ID NO:[69] 68).

The paragraph beginning at line 1 of page 17 has been amended as follows:

Figure 32 (SEQ ID NOS:112-117) shows the sequences of peptides useful for production of antibodies.

The paragraph beginning at line 3 of page 17 has been amended as follows:

Figure 34 (SEQ ID NOS:118-121) shows two degenerate primers used in PCR to identify the *S. pombe* homolog of the *E. aediculatus* p123 sequences.

The paragraph beginning at line 5 of page 17 has been amended as follows:

Figure 35 (SEQ ID NOS:119, 121) shows the four major bands produced in PCR using the degenerate primers.

The paragraph beginning at line 7 of page 17 has been amended as follows:

Figure 36 (SEQ ID NOS: 58, 118, 121-130) shows the alignment of the M2 PCR product with *E. aediculatus* p123, *S. cerevisiae*, and *Oxytricha* telomerase protein sequences.

The paragraph beginning at line 9 of page 17 has been amended as follows:

Figure 37 (SEQ ID NOS:131-132) is a schematic showing the 3' RT PCR strategy.

The paragraph beginning at line 15 of page 17 has been amended as follows:

Figure 41 (SEQ ID NOS: 133-147) shows the alignment of RT domains from telomerase catalytic subunits.

The paragraph beginning at line 17 of page 17 has been amended as follows:

Figure 42 (SEQ ID NOS: 2, 55, 69) shows the alignment of three telomerase sequences.

09766253 082004

The paragraph beginning at line 25 of page 17 has been amended as follows:

Figure 47 (SEQ ID NOS: 100-101) shows the DNA (SEQ ID NO:100) and amino acid (SEQ ID NO:101) of the ORF encoding an approximately 63 kDa telomerase protein or fragment thereof.

The paragraph beginning at line 28 of page 17 has been amended as follows:

Figure 48 (SEQ ID NOS: 148-171) shows an alignment of reverse transcriptase motifs from various sources.

09766253 083001